

Work Order ID 138597

138597

Tuesday, November 03, 2015 11:48:13 AM

Page 1

Item ID: D6104-009 Accept ***N900040100*** Setup Start ***NS1***
 Revision ID: Stop ***NS2***
 Item Name: Round Billet, 17-4
 Start Date: 11/3/2015 Start Qty: 10.00 ***10*** Cust Item ID:
 Required Date: 11/3/2015 Req'd Qty: 10.00 ***10*** Customer:
 Reference:

Approvals: Process Plan: MS Date: NOV 03 2015 Tooling: _____ Date: _____ Run Start ***NR1***
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	Revision Nbr								
D6104	Rev B								

100 PURCHASING 0.00
100
 Purchasing Memo 0.00
 Purchasing Issue P/O: 30362 a) Description: S.S round billet b) Ø5.25" x 4.100" long c) Tolerance on all dimensions are +0.030"/-0.000" d) Material: 17-4PH Stainless steel e) Material certification required
CY NOV 04 2015 10

110 Receive & Inspect for Damage & Mat'l Certs 0.00
110
 Packaging Memo 0.00
 Packaging Ensure material certification is attached
10x 2015-11-16

120 QC6- Inspect dimensions to drawing 0.00
120
 QC Memo 0.00
 Quality Control Ensure Material certification comply to Dwg D6104
10 0 **DAS 14 9-89**
15/11/17

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐					
Date :		Step #:		QTY Effective :			MRB (QSI042) Approval Completed By _____ Lead hand / Supervisor Approval Verification _____ QC / QA Coordinator Approval _____		
Description Work Order Deviation				Disposition					
Root Cause Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☐ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐ No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐		FAULT CATEGORY Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐ Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐		Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Misabeled ☐ Fit/Function ☐ Misaligned/off center ☐ Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐					
		OTHER : _____							

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Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130	Identify as per dwg & Stock Location: MAT043	0.00							
130									DAS
Packaging	Memo	0.00				<u>10</u>	<u>0</u>		14
Packaging	LOCATION: MAT043								9.89
									15/11/17
140	QC21- Final Inspection - Work Order Release	0.00							
140									
QC	Memo	0.00					<u>MLJ</u>	<u>NOV 17 2015</u>	
Quality Control									

MLJ NOV 17 2015

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐					
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		OTHER : ☐							

Tuesday, November 03, 2015 11:48:18 AM

138597

D6104-009

Required Date: 11/3/2015

Required Qty: 10.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D6104-009P		Purchased	No			110	Each	0.0000	1	10			
D6104-009P									**	10x SP15-11-16			
17-4 SS Roundbar 5.25"Od													

DQA: _____ Date: _____



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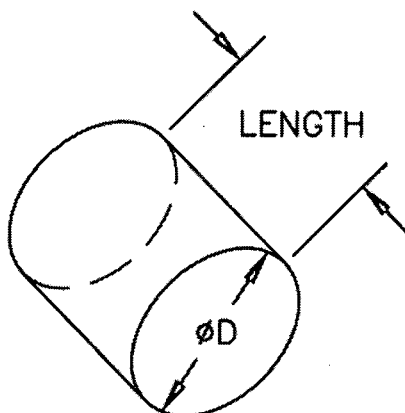


DESIGN RF	DRAWN BY [Signature]	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED [Signature]	APPROVED [Signature]	DRAWING NO. D6104	Rev. B SHEET 1 OF 1
DATE 02.11.25		TITLE ROUND BILLET, 17-4	SCALE NTS
A	01.04.10	NEW ISSUE	
B	02.11.25	CLARIFY ALLOY SPEC ADDED D6104-009/-011 REDUCE LENGTH OF BILLETS	

RELEASED

02.11.29 [Signature]

SPECIFICATION CONTROL DRAWING



138599-1115
1571-05
COPY
ATTENTION
STAMPING
RECEIVED COPY
TO APPENDMENT
NOTICE
FOR ORDER

MATERIAL: 17-4 PH SS (AMS 5643 OR AISI 630) MIN UTS = 170 KSI (38 HRC)

PURCHASE MATERIAL ACCORDING TO THE FOLLOWING TABLE. SPECIFY ALLOY, DIAMETER x LENGTH (+0.030/-0.000) AS SHOWN.

TOLERANCE ON ALL DIMENSIONS IS +0.030/-0.000.

ALL DIMENSIONS ARE IN INCHES

Part No.	Alloy	D (Diameter)	Length
D6104-001	17-4 PH STAINLESS STEEL	Ø3.00	3.80
D6104-003	17-4 PH STAINLESS STEEL	Ø3.25	3.80
D6104-005	17-4 PH STAINLESS STEEL	Ø4.00	5.10
D6104-007	17-4 PH STAINLESS STEEL	Ø4.50	5.10
D6104-009	17-4 PH STAINLESS STEEL	Ø5.25	4.10
D6104-011	17-4 PH STAINLESS STEEL	Ø6.50	4.10

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Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
Tel: 613 632 9577
Fax: 613 632 1053

PURCHASE ORDER

Purchase Order ID PO30362

Purchase Order Date 11/4/2015

PO Print Date 11/4/2015

Page Number 2 of 2

Buyer From :
METAUX CASTLE
P.O. BOX 4090 STN A
TORONTO, ONTARIO M5W OE9
CANADA

VU-MET002

Ship To : DART AEROSPACE LTD
1270 ABERDEEN
HAWKESBURY, ON K6A 1K7
CANADA

Contact Name

Vendor Phone

Ship To Contact

Ship To Phone

Ship Via: Yours ppd

Ship Acct:

Buyer

Customer POID

Customer Tax #

Terms

Currency

FOB

Chantal Lavoie

10127-2607

Net 30

USD

Destination-Collect

3	D6104-009P	17-4 SS Roundbar 5.25"Od	11/19/2015	10.00 Each	\$137.80	\$1,378.00
			Yes			
			11/19/2015			

AS PER DWG D6104 REV. B
B138597

MATERIAL: 17-4 PH AS PER AMS 5643 OR AISI 630
SIZE: 5.25" DIA. X 4.10" LENGHT
TOLERANCE AS PER QUOTE +.030"/-.000"

8915-11-16

Line Total: \$1,378.00

4	71401-45	PROCUREMENT QUALITY CLAUSES	11/19/2015	1.00	\$0.00	\$0.00
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No

Procurement Quality Clauses

A005 right of entry

A012 chemical and physical test report

A016 personnel qualification

A017 raw material identification (as applicable)

A026 certification of materila conformance

A041 quality management system

A042 dart notification by supplier

A043 retention of quality documents

11/19/2015

Line Total: \$0.00

PO Total: \$2,517.50

Note: Terms & Condition of Purchasing(Suppliers) and Procurement Quality Clauses are an integral part of our AS9100 requirements. To learn in detail, please visit www.dartaerospace.com for further explanation.

Change Nbr: 1

Change Date: 11/4/2015

**Castle Metals®**

A. M. Castle & Co.

PACKING SLIP/
CERTIFICATE OF CONFORMANCE

Page 1 of 2

Shipment No:2787542

Ship From: A. M. Castle & Co. TORONTO - CASTLE METALS 2150 ARGENTIA ROAD MISSISSAUGA, ON L5N 2K7		Sold To: DART AEROSPACE LTD 1270 ABERDEEN HAWKESBURY, ON K6A 1K7 CA		Ship To: DART AEROS,HAWKESBURY,O N,CAN 1270 ABERDEEN HAWKESBURY, ON K6A 1K7 CAN		Deliver To: DART AEROSPACE LTD 1270 ABERDEEN HAWKESBURY, ON K6A 1K7 CA	
Date Shipped 12-NOV-2015	F.O.B. ORIGIN	Freight Terms Prepaid		Carrier MANITOULIN		BOL No 2787542-2	

Shipment Details	Final Destination Branch - TOR
-------------------------	---------------------------------------

Order No 4124821	Line No 2	Item No 6004.MO	Description 5.2500.RD.17CR-4NI.STAINLESS.RT.SOL TR.COND A.132.0000-156.0000 CUT TO 4.1 IN (+ .1250/- .0000 IN) - BAND SAW CUTTING SPECIFICATIONS: AMS 5643 Email P/s and certs to: clavoie@dartaero.com				
Purchase Order No 30362	Part Number YOUR ITEM NUMBER: D6104-009		Ordered Qty 10.00 PCS		Invoice Qty 10.00 PCS		
Details		ALL PAPERWORK MUST FOLLOW ORDER / CUSTOMER MUST RECEIVE AT TIME OF DELIVERY ALL MATERIAL MUST HAVE IDENTIFYING MARKINGS EX:HEAT #'S END USER: DART AEROSPACE END USE: COMMERCIAL AIRCRAFT PARTS					
Delivery No. 120241857	Mill OUTOKUMPU STAINLESS INC.	Heat Number 	Mech Id	PCS 10	Width (IN)	Length (IN)	Shipped Qty(LBS) 258.8384

These commodities/technologies are subject to US Export Administration & US State Dept. Regulations and, if intended for export, were/are exported thereunder. Diversion contrary to US Law is Prohibited.

We hereby certify the material covered by this certification conforms in accordance with the above specifications and has been found to meet the applicable requirements for the material, including any specifications forming a part of the description. Test reports are on file subject to examination. All claims for defective material are waived unless made in writing to A.M. Castle & Co. within 60 days of the shipment. Material cut to the correct size, or material cut by the customer cannot be returned for credit.

These commodities, technology or software were exported from the United States in accordance with the Export Administration Regulations. Diversion contrary to US law prohibited.

Date Printed: 12-NOV-2015 05:17:42 PM



Castle Metals®

PACKING SLIP/
CERTIFICATE OF CONFORMANCE

A. M. Castle & Co.

Page 2 of 2

Reviewed by Authorized Castle Metals Representative:

Date:

Name:

NOV 12 2015



CASTLE METALS - CLE

HEAT NUMBER E1200916

MECHANICAL ID _____

ITEM CODE W004

LOT NUMBER 1244141

EC NUMBER 214564

DATE 7/23/13

O. Utokumpu

COMMENT _____

APPROVED KD



Certificate of Test

Page: 1

HEAT E120996 ORDER 638627/ 01 BOL 0223406 * CERTIFICATION * 07/18/13

SHIP TO:
A. M. CASTLE & CO.
26800 MILES ROAD
216-292-7600
BEDFORD HEIGHTS

441460000

214564

YOUR ORDER & DATE
7/18/13 CUST# 0254001 CUST TAG#6004

GRADE 17-4 ITEM DESCRIPTION
Size 17-4 RND HRART CONDA 5.2500 x 144.000 RD
Country of Melt: UNITED KINGDOM Country of Mfg.: UNITED STATES
NAFTA Country of Origin is Country of Melt

No weld repair
Free of mercury contamination, Free of radiation contamination
No WEEE relevant substances; Meets EU electrical ROHS

Total Bundles 1 Total Weight 2860

WO 2041603 Bundles: 1A

DAS
14
9-89 15/11/17

MFG TO FINISHED BAR IN THE USA FROM BILLETS IMPORTED UNITED KINGDOM
AMS 2303F

UNS S17400 AISI 630
ASTM A484 15
DFARS 252.225.7009 10/4/11
Sol Ann 1900F/1Hr/Rapid Cool
Reduction Ratio 3:1 minimum

AMS 5643R
ASME SA564 E10 A11a
ASTM A564 10 Type 630
AM Castle 3174-02 R34
AISI 630, UNS S17400

MECHANICAL & OTHER TESTS			
Hardness as shipped	301 HB	Hardness as tested	409 HB
Hardness as shipped	032 HRC	Hardness as tested	(44 HRC)
Grain size	6.0	Tensile strength, KSI (MPa)	209.0 (1441)
Micro	OK	0.2% Yield Strngth, KSI (MPa)	187.0 (1289)
Intergranular corrosion		Elongation % in 4D	11.0
Macro	OK	Reduction of area %	41.0
Ferrite	1.0		

H900 capability sample aged at 900F/1hr/AC then tensile and HRC tested

CHEMICAL COMPOSITION			
Carbon (C)	.015	Manganese (Mn)	.740
Phosphorus (P)	.026	Sulphur (S)	.026
Silicon (Si)	.370	Chromium (Cr)	15.440
Nickel (Ni)	4.690	Cobalt (Co)	.091
Copper (Cu)	3.310	Moly (Mo)	.240
Nitrogen (N)	.037	Columbium (Cb)	.250
Titanium (Ti)	.005	Aluminum (Al)	.004
Tin (Sn)	.015	Boron (B)	.002
Tantalum (Ta)	.003	Vanadium (V)	.060
Tungstem (W)	.024		.000
Columbium/			
Tantalum (Cb+Ta)	.253		
Iron (Fe)	Balance		
Frequency	.000	Severity	.000
Melt Practice	EAF		
Refining Practice	AOD		
De-long Ferrite			

Knowingly & willfully falsifying or concealing a material act on this form, or making false, fictitious or fraudulent statements or representations herein could constitute a felony punishable under federal statutes. We hereby certify that the test results shown in this report are correct and accurate as contained in the records of the company and are in compliance with the specifications, codes, and standards listed above.

M.F. Marcanio, Quality Manager

M.F. Marcanio

MATERIAL RECEIPT INSPECTION FORM

MATERIAL: D6104-009
 DATE: 15/11/17

PO / BATCH NO.: 30362/138597

MATERIAL CERT REC'D: yes
 QUANTITY RECEIVED: 10
 QUANTITY INSPECTED: 10
 QUANTITY REJECTED: _____

THICKNESS ORDERED: 05.25 X 4.100
 THICKNESS RECEIVED: 05.30 X 4.160
 SHEET SIZE ORDERED: _____
 SHEET SIZE RECEIVED: _____

DESCRIPTION	NCR (Check Y/N)		COMMENTS
SURFACE DAMAGE	Y	☒	
CORRECT FINISH	☒	N	
CORROSION	Y	☒	
CORRECT GRAIN DIRECTION	☒	N	
CORRECT MATERIAL	☒	N	
CORRECT THICKNESS	☒	N	
PHOTO REQUIRED	Y	☒	
CORRECT MATERIAL	☒	N	
CORRECT REF # TO LINK CERT	☒	N	
CORRECT MATERIAL IDENTIFICATION	☒	N	
CORRECT M# ON THE MATERIAL	☒	N	
DOES THIS MATERIAL REQUIRE ENGINEERING SIGN OFF	Y	☒	
DOES THIS REQUIRE AN EXTRUSION REPORT	Y	☒	

CUT SAMPLE PIECE OF MATERIAL AND PREFORM A HARDNESS CHECK. RECORD RESULTS BELOW					
TYPE OF MATERIAL SIZE OF TEST SAMPLE HARDNESS / DUROMETER READING	HRC	HRB	DUR A	DUR D	

testers located in the Quality Office

QC 18 INSPECTION		ENGINEERING SIGNOFF (if required)	
INSPECTED BY: <u>DAS 14</u> DATE: <u>15/11/17</u>	SIGNED OFF BY: _____ DATE: _____		

Attach this inspection sheet with the corresponding material cert and remit to be scanned and received in

MATERIAL RECEIPT INSPECTION FORM

INSTRUCTIONS FOR INSPECTING BAR, TUBING, ROUND, & SHEET STOCK

- 1- VERIFY STOCK TO DART PURCHASE ORDER
- 2- MEASURE ALL DIMENSIONS FOR EACH PURCHASED STOCK
 - a. WIDTH, THICKNESS, DIAMETER, WALL THICKNESS & LENGTH
- 3- VERIFY CONDITION OF MATERIAL i.e. DAMAGED, CORRODED, etc.
- 4- VERIFY THAT SUPPLIER HAS A NUMBER (HEAT #) ON ITS RECEIVING REPORT TO LINK TO MATERIAL CERTS
- 5- VERIFY MATERIAL CERTS ARE CORRECT TO THE DART PO INSTRUCTIONS
- 6- REMOVE / CUT A PIECE OF MATERIAL FOR SAMPLE HARDNESS TESTING

INSTRUCTIONS FOR INSPECTING SKIDTUBE & STEP EXTRUSION

- 1- VERIFY TO DART SUPPLIED DRAWING
- 2- SAMPLE INSPECT MATERIAL IN BUNDLE TO ENSURE MATERIAL CAN BE RECEIVED INTO DART
- 3- USING PORTABLE HARDNESS TESTER VERIFY HARDNESS OF THE MATERIAL TO THE DRAWING
- 4- VERIFY THAT MATERIAL CERTS MATCH TO WHATS CALLED UP ON THE DART DRAWING

AFTER MATERIAL PASSES INSPECTION

- 5- HAVE DART EMPLOYEES START STOCKING MATERIAL BUT REQUEST MIN **20pcs** FOR FULL INSPECTION
- 6- INSPECT ALL DIMS AS PER DRAWING REQUIREMENTS

INSTRUCTIONS FOR INSPECTING CROSS TUBE MATERIAL

- 1- VERIFY MATERIAL CERTS MATCH THE REQUIREMENTS ON THE DART DRAWINGS
- 2- INSPECT MIN. HALF THE BATCH OF EXTRUSION RECEIVED INTO DART
- 3- INSPECT MATERIAL AS PER THE EXTRUSION REPORT
 - a. WALL THICKNESS USING ULTRA-SONIC IN 4 LOCATIONS
 - b. OUTSIDE DIAMETER HIGHEST/LOWEST BOTH ENDS
 - c. INSIDE DIAMETER HIGHEST/LOWEST BOTH ENDS
 - d. STRAIGHTNESS @ CENTER OVER 12' SPAN
 - e. WALL THICKNESS USING TUBE MICROMETER HIGHEST/LOWEST BOTH ENDS
- 4- IDENTIFY EACH TUBE IN SEQUENCE OF INSPECTING (TUBE 1, TUBE2.....) AND W/O# AND PO#
- 5- RECORD ALL FINDINGS ON EXTRUSION REPORT

IF ANY QUESTIONS PLEASE SEE QC COORDINATOR BEFORE GOING FURTHER